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PINE MILL BRIDGE
Iowa Bridges Recording Project
Spanning Pine Creek
Muscatine Vicinity
Muscatine County
Iowa

HAER No. IA-69

BLACK & WHITE PHOTOGRAPHS

WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

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PINE MILL BRIDGE

HAER No. IA-69

Location:	Spanning Pine Creek at an abandoned county road in Wildcat Den State Park; 7.8 miles northeast of Muscatine; Muscatine County, Iowa UTM: 15.676820.4593620 USGS: Illinois City, IA.-Ill. quadrangle (7.5 minute series, 1970)
Date of Construction:	1878
Designer/Contractor:	Wrought Iron Bridge Company, Canton, Ohio
Present Owner:	State of Iowa
Present Use:	Pedestrian bridge
Significance:	By the 1880s, the pin-connected Pratt through truss was almost the exclusive structural type for medium-span roadway crossings in Iowa. The Pine Mill Bridge is distinguished among these by its early date and is a classic example of work by the Wrought Iron Bridge Company. It stands next to a maintained grist mill, and is the only remaining site in Iowa in which the relationship of mill and bridge is preserved.
Historian:	Leslie Pitner, August 1995
Project Information:	This document was prepared as a part of the Iowa Historic Bridges Recording Project performed during the summer of 1995 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research was performed by Clayton B. Fraser of Fraserdesign, Loveland, Colorado.

INTRODUCTION

In June 1877 the Muscatine County Board of Supervisors received a petition from the citizens of Montpelier Township requesting a permanent bridge over Pine Creek at the Pine Creek Mill. The supervisors were in favor of building the bridge, "as soon as the finances of the county will permit," but it could not be done that year. The petitioners approached the board again in January 1878, and the supervisors delayed action on the proposed bridge until that June. By July the county signalled that it was finally ready to build the bridge by hiring a contractor to construct the stone abutments. In August the auditor solicited bids from the various bridge companies; in September a contract to fabricate and erect the truss was issued to the Wrought Iron Bridge Company of Canton, Ohio, one of the largest bridge companies in the country.[1] The Pine Mill Bridge was completed by the end of the year. Configured as a pinned Pratt through truss, it has functioned in place since in essentially unaltered condition. Standing next to a maintained grist mill in a state park, the Pine Mill Bridge is the only remaining example of the combination of mill and bridge that once were so plentiful in Iowa.

BACKGROUND

Iowa is graced by dozens of rivers and streams. While these waterways supported the state's transformation from a frontier to one of the world's foremost agricultural producers, they also created the need for thousands of bridges, both large and small. These rivers, creeks and streams had to be spanned to sustain Iowa's growth after receiving statehood in 1846. By the 1870s, when the Pine Mill bridge was built, Iowa had seen rapid development. The population tripled from 1850 to 1860, and continued to more than double in the next decade.[2] With the influx of settlers from the eastern areas of the United States and from Europe, the amount of cultivated land grew to 36 million acres by 1880.[3] As the railroads began to arrive in the 1860s and 70s, the infrastructure was set to move Iowa's produce to

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[1]Muscatine County Board of Supervisors Minutes, June 8, 1877 (Book C, p. 92), September 8, 1877 (C, 99), April. 5, 1878 (C, 132), June 6, 1878 (C, 139), August 10, 1878 (C, 141), September 3, 1878 (C, 144).

[2]Leland L. Sage, A History of Iowa, (Ames, Iowa: The Iowa State University Press, 1974), 92.

[3]Joseph Frazier Wall, Iowa: A Bicentennial History, (New York: W.W. Norton & Company, Inc., 1978), 127.

outside markets. This growth also created the continual need for new and improved roadways to move crops and livestock to local railroad depots.

The need for new bridges is documented in the endless petitions for bridges presented to the County Boards of Supervisors who were the primary form of local government in Iowa. It fell to each county to provide its own infrastructure of roads and bridges. Rather than plan for the provision of such roads, the boards responded to citizens' requests for new roads and bridges. Bridge petitions were presented to the board, which would then take the requests under consideration depending on the state of the county Bridge Fund, the size and cost of the bridge, and whether the bridge could be built by county labor or would require an outside bridge contractor. The type of bridges built in any given county depended on county finances and the preferences of the board which served.

When a large-scale bridge was needed, the county would request bids from bridge contractors. These could be all large regional companies or include local bridge contractors. The contract would then be awarded to the firm with the best design and lowest bid. Usually this meant the lowest bid, although occasionally the counties chose a different, yet still low bid because they preferred that company's design. This process left the board at the hands of the contractors and led to few standards of quality or design.

MUSCATINE COUNTY AND PINE MILL

The Pine Mill Bridge is located just downstream from a grist mill established by Benjamin Nye, the first settler in Muscatine County. Nye came to Muscatine in the spring of 1834 with his cousin Stephen Nye. In 1832, the United States Government had acquired the area of Muscatine and much of Iowa along the Mississippi under the Black Hawk Purchase Treaty. The treaty had called for the Indians to remove themselves from the land by June 1, 1833, which then opened up the area for white settlers.[4] Nye and his cousin settled on opposite sides of Pine Creek, near the future site of the mill. As soon as his cabin was finished, Benjamin Nye went to St. Louis for a load of goods and opened a store on his return. In the fall of 1834, Benjamin Nye returned to Ohio to bring back his wife and family.[5] Since Nye and his

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[4]Sage, 50-1.

[5]Irving B. Richman, ed., History of Muscatine County, Iowa from the Earliest Settlements to the Present Time, (Chicago: The S.J. Clarke Publishing Co., 1911), 209.

wife were originally from Vermont, they named their new settlement Montpelier, the name later given to the township.[6]

Nye built his first mill on Pine Creek in 1835, but it was too close to the Mississippi River and soon washed out. His next mill, a saw mill, was built upstream on the creek, on the opposite bank of the site of the present mill. In 1837, Nye built a grist mill across from the saw mill. This mill was very successful and soon outgrew its facilities.[7] A contemporary description indicates the importance of Nye's grist mill to early settlers and the trials they experienced to reach it:

> I came to the timber and after driving a while came to a sawmill. I inquired for the grist-mill. I could see nothing of any. They told me it was under the saw mill, so I drove up and looked around. Found a little cubby hole under the saw mill where they cracked the corn. I had been two days and a half in finding this little corn cracker....I had made the trip in the incredible short time of five days without shipwreck. On my arrival home, the neighbors came in to congratulate me on my safe arrival and borrow some meal until it should be their turn to go.[8]

Although Nye had been building mills since 1835, the Territorial Legislature gave him official approval on January 12, 1839. The bill was signed by the governor and was the first law to sanction a dam and mill site in Iowa.[9]

The Pine Mill Bridge stands downstream from Nye's fourth mill, a new, larger grist mill that he constructed in 1848. It was built from native lumber that Nye sawed at his own mill. Built at a cost of $10,000, the mill was constructed of the largest timber used in any building in the county. Nye operated the mill until his death in 1852. The mill then passed to his son-in-law, Robert Patterson. By 1878, when the Pine Mill Bridge was

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[6]R. Neumann Assoc., The Pine Creek Grist Mill - Wildcat Den State Park, Iowa State Conservation Commission, 1979, 15.

[7]R. Neumann Assoc., 6.

[8]"My First Trip to the Mill," in Muscatine History Notes, eds. Jo Ann Carlson and Barbara Bublitz, (Muscatine, Iowa: Musser Public Library, 1989), 128-9.

[9]R. Neumann Assoc., 7.

erected, the mill had been bought by Herman Huchendorf, a German immigrant to Muscatine County.[10]

The petition for the Pine Mill Bridge was driven by the desire for year-round convenient access to the grist mill. For most of the year, Pine Creek was easily forded, its depth occasionally diminished to only a few inches. With heavy rainfall, however, the creek could be turned into a rampaging stream, especially as it spilled over the mill dam. The potential violence of the creek was demonstrated in 1883 when the bridge was subject to an enormous flood, as the previous winter had been particularly harsh with an enormous amount of snow. Around February 14, however, a warming trend came, followed by two days of torrential rain. With the rain and the melting snow, Pine Creek swiftly rose to the level of the second floor windows of the mill. The bridge had some significant damage, but managed to survive with only local repairs.[11]

WROUGHT IRON BRIDGE COMPANY

The contract for the Pine Mill Bridge was given to the Wrought Iron Bridge Company of Canton, Ohio, which at that time was one of the largest bridge fabricators and contractors in the United States. Wrought Iron Bridge is a model of the successful nineteenth century bridge company which sold the pin-connected wrought-iron trusses that were the American standard.

The Pratt truss constructed over Pine Creek was the standard design for the company, and typical of a Pratt. As described in a 1885 catalog, "this plan is designed for spans of 80 to 150 feet. It is the design now almost universally adopted for both Railway and Highway Bridges of moderate span."[12] The Pine Mill Bridge consists of seven panels, for a 96' span and a 16' roadway. The upper chords and inclined end posts are two channels with cover and batten plates, with both looped square eyebars and forged, rectangular eyebars for lower chords. The verticals are two T-sections joined by a continuous plate and I-beams, except for the hips, which are two star irons. The hip connection is a cast-iron joint block, rather than a pin connection, in order to overcome the inherent weakness of this

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[10]R Neumann Assoc., 17-8.

[11]"Ebb and Flow: Interesting Notes about the Flood," Muscatine Daily Journal, February 17, 1883, 2.

[12]Wrought Iron Bridge Company, Illustrated Pamphlet of Wrought Iron Bridges Built by Wrought Iron Bridge Co., Canton, Ohio, 1885, 6.

particular connection. The diagonals consist of two looped square eyebars. The truss also has a horizontal tie, a feature typical of Wrought Iron Bridge Pratt trusses. Floor beams on bridges of this vintage usually have been replaced, but on this one, they are the original "fish belly" beams of greater depth in the middle to better resist the greater bending force.

David Hammond was the guiding force behind the Wrought Iron Bridge Company. Born in Plain Township, Ohio in 1830, Hammond moved to Canton, Ohio when he was eighteen to serve as an apprentice carpenter. By the time Hammond was thirty, he had begun his own construction company and was building small timber bridges. Together with John Laird, the owner of a foundry, and Washington R. Reeves, a metal worker, Hammond developed a combination wood and iron bridge which he patented. In 1864, Hammond and Reeves formed a partnership for general and bridge contracting and patented their bowstring arch-truss design.[13]

By 1870, Hammond had struck out on his own, and in January 1871, he incorporated the Wrought Iron Bridge Company (WIBC). During the 1870s, the company had tremendous success. In its first year, WIBC sold 100 bridges worth $200,000. Sales more than doubled over the next two years, and by 1877, WIBC employed over 300 men who worked around the clock to produce the wrought-iron truss bridges that had been contracted. As a bridge fabricator, WIBC created its market through appealing to county officials. It advertised in trade periodicals and distributed illustrated pamphlets to officials describing examples of their work.

During the 1870s, the primary truss type constructed by WIBC was the bowstring arch patented by Hammond.[14] By the late 1870s, however, the bowstring arch was losing popularity to the more economically produced and erected Pratt truss. Wrought Iron Bridge Company began to focus sales on the parallel chord trusses, such as the Pratt, which grew to be all of the company's business by the 1880s. Iowa was a particularly good customer for Wrought Iron. By 1885, the company had built 21,600 feet of bridges in Iowa.[15] The increasing construction of rural roads and bridges in Iowa during the 1870s coincided with Wrought Iron Bridge Company's growth in importance in the bridge industry, and the Pine Mill Bridge is a classic example of its work in Iowa.

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[13]Clayton Fraser, "Freeport and Lower Plymouth Rock Bridges," HAER Report IA-19, 1986.

[14]Fraser, 10-2.

[15]Wrought Iron Bridge Company, 22.

From the early 1880s until the establishment of state bridge standards in 1913, the pin-connected Pratt through truss was virtually the exclusive structural type for medium-span roadway crossings in Iowa. Its standardized fabrication, economy of materials, and ease of erection made it a mainstay among the various state and regional bridge companies. Thousands of such trusses were built throughout the state during this period and numerous examples remain in use today. The Pine Mill Bridge is distinguished among these for its relatively early construction date and high degree of structural integrity. Located in a pristine setting next to the restored Pine Mill, it is one of the state's most picturesque bridges, giving a view back in time.

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ADDENDUM TO
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This appendix is an addendum to a 8-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."